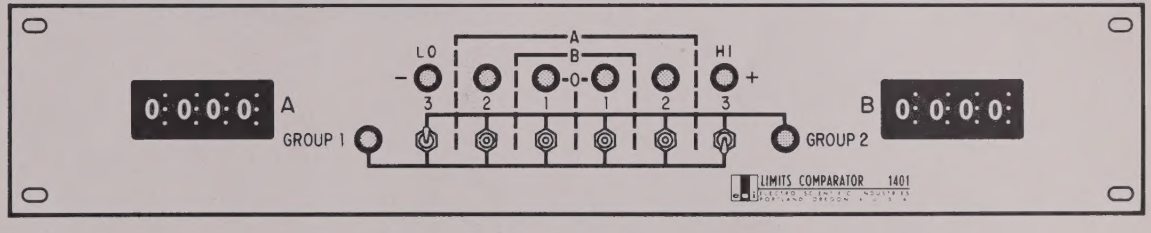
Maintenance Manual
AUGUST 1970

MODEL 1401

LIMITS COMPARATOR



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PORTAMETRIC® Portable Measuring Instrument
PVB® Potentiometric Voltmeter Bridge

SECTION I

INTRODUCTION

1.1 DESCRIPTION

The ESI Model 1401 Limits Comparator is an accessory used with the Model 501 System to facilitate high-speed sorting of resistors. It provides a six-band categorization of resistance deviation from nominal, symmetrical about zero deviation. Two auxiliary outputs allow any combination of the six bands to be placed into two additional groups, allowing great flexibility of sorting modes. Figure 1-1 shows the front panel of the Limits Comparator.

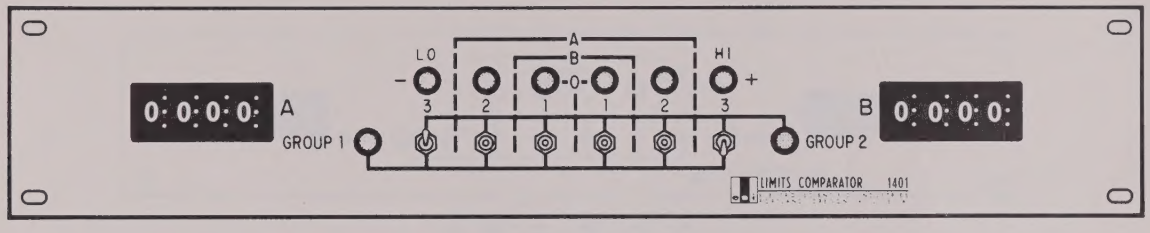

Figure 1-1. Limits Comparator Front Panel

1.2 SPECIFICATIONS

Outputs: Open collector NPN (2N3904) transistors.

Output Breakdown Voltage: +30 VDC with respect to ground.

Maximum Output Current: 100 mA.

Dimensions: Height 3.5 in. (8.9 cm), width 19 in. (48.26 cm), depth 6 in. (15.24 cm).

Net Weight: 4.5 lb (2.04 kg).

SECTION II

CONTROLS AND CONNECTORS

2.1 FRONT PANEL CONTROLS

Thumbwheel switches A and B set the defining values of the deviation bands. A sets the outside value, B the inside.

Six toggle switches establish the desired combination of deviation bands into two groups. The down position places the band in group 1 and the up position places it in group 2. The middle position is neutral, placing the band in neither group. See Figure 2-1.

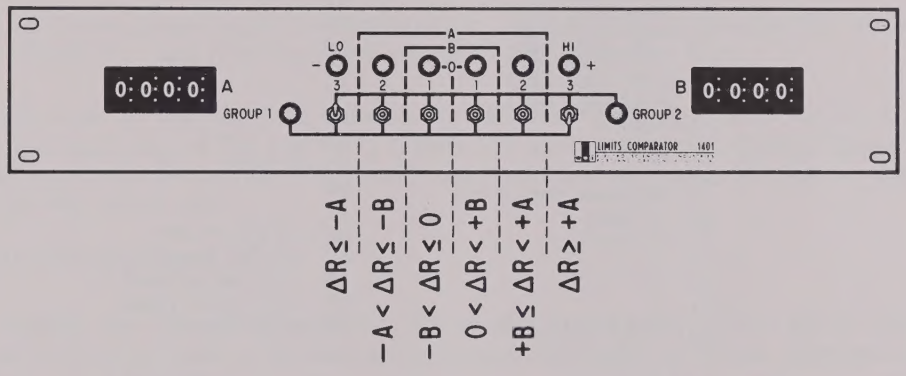

Figure 2-1. The Six Deviation Bands of the Limits Comparator

The lamps above the toggle switches indicate the degree of deviation relative to the values set on the thumbwheel switches. See Figure 2-1. Normally, only one of these six lamps lights at a time, following each bridge measurement. If a lead failure or overload occurs, both LO and HI lamps will light simultaneously.

GROUP 1 and GROUP 2 lamps indicate that a deviation falls in the band or bands set by the toggle switches. If all toggle switches are in the neutral position, neither lamp will light.

2.2 REAR PANEL CONNECTORS

The Model 1401 has one 50-pin terminal which connects the Limits Comparator to the Deviation Bridge. Pin connections on this jack are shown in Figure 2-2, plug connections in Figure 2-3.

PIN	SIGNAL
1	Input Digit 1
2	Input Digit 2
3	Input Digit 4
4	Input Digit 8
5	Input Digit 10
6	Input Digit 20
7	Input Digit 40
8	Input Digit 80
9	Input Digit 100
10	Input Digit 200
11	Input Digit 400
12	Input Digit 800
13	Input Digit 1000
14	Input Digit 2000
15	Input Digit 4000
16	Transfer
17	Reset
18	
19	Reference Integration
20	(-) Input
21	(+) Input
22	
23	
24	
25	>A(-) Output

PIN	SIGNAL
26	Group 1 Output
27	Group 2 Output
28	>A(+) Output
29	>B, <A(-) Output
30	<B(-) Output
31	<B(+) Output
32	>B, <A(+) Output
33	Lead Check
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	Φ Input
44	
45	
46	+5 VDC Power
47	+5 VDC Power
48	+5 V Return Power
49	+5 V Return Power
50	+137 V Power

Figure 2-2. Pin Connections, Model 1401 to Model 280

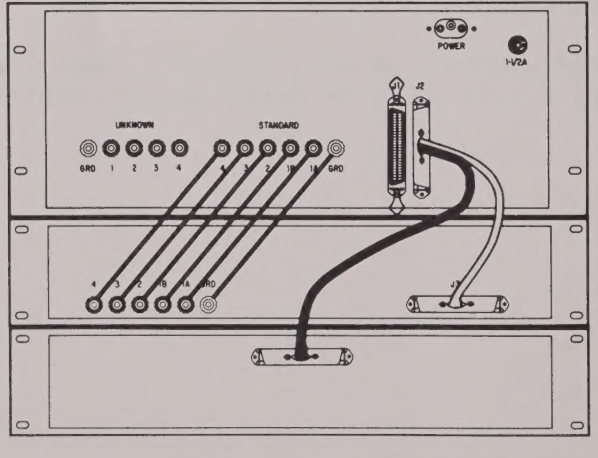

Figure 2-3. Model 1401, Rear Panel Connections to Model 501 System

SECTION III

PERIODIC MAINTENANCE

The following procedures should be performed periodically (approximately once a year) to insure maximum accuracy and reliability from the Model 1401 Limits Comparator.

If problems cannot be isolated, the instrument should be returned to the factory for repair. The service department will be glad to furnish the necessary information for repairs as well as any replacement parts. However, unauthorized repairs will invalidate the instrument warranty.

3.1 REMOVING THE UNIT AND COVER

Prepare a soft, clean place to set the instrument. Be sure that no projections or pointed objects will be underneath it. See that there are no metal filings in the area.

Disconnect all wires or cables, then remove the four mounting screws on the front panel and pull the unit straight back out of the cabinet. Place the unit on the prepared surface, remove the six screws on the top cover (2 on top, 2 on each side) and the two upper screws on the front panel, and lift the cover off.

3.2 VISUAL INSPECTION

Inspect the outside for damage to switches, lamps and connectors. Then check internally for possible defects such as loose or broken connections, damaged switches, damaged or dirty socket contacts, and failed lamps.

3.3 ELECTRICAL TESTING

1. Reconnect the Model 1401 to the Model 501 System, with the Limits Comparator out of the cabinet.

2. Connect a resistor of known value to the Model 280 (ESI Model RS 925A or equivalent is recommended).

3. Set appropriate limits on the Model 1401.

4. Change the settings of the Model RS 727 to exceed these limits, verifying that the proper lamps light and the proper signals appear at the rear panel connector.

3.4 REPLACING THE COVER AND UNIT

Be sure that the interior of the instrument case is completely clear of all foreign material. Replace the top cover and its screws. Line up the four front panel screw holes with the cabinet mounting holes and secure the unit in the cabinet.

SECTION IV

REPLACEMENT PARTS

4.1 PARTS LIST

The following parts are listed alphabetically by description. All parts are available from Electro Scientific Industries, Inc.

The Federal Supply Code for Manufacturers (FSCM) for Electro Scientific Industries is 11837.

When ordering parts, please include the following information:

Model and serial number of the instrument
ESI part number
Description of part

DESCRIPTION	ESI PART NO.	QTY USED
Integrated Circuit, MC 1802	20630	2
Integrated Circuit, SN 7400N	20600	7
Integrated Circuit, SN 7401N	20601	7
Integrated Circuit, SN 7420N	20604	1
Integrated Circuit, SN 7473N	20613	1
Lamp, Neon, Amber	20300	2
Lamp, Neon, Clear	20301	2
Lamp, Neon, Red	20302	2
Lamp, Neon, Yellow	20303	2
Transistor, 2N 3904	18751	8
Transistor, 2N 4410	20305	8

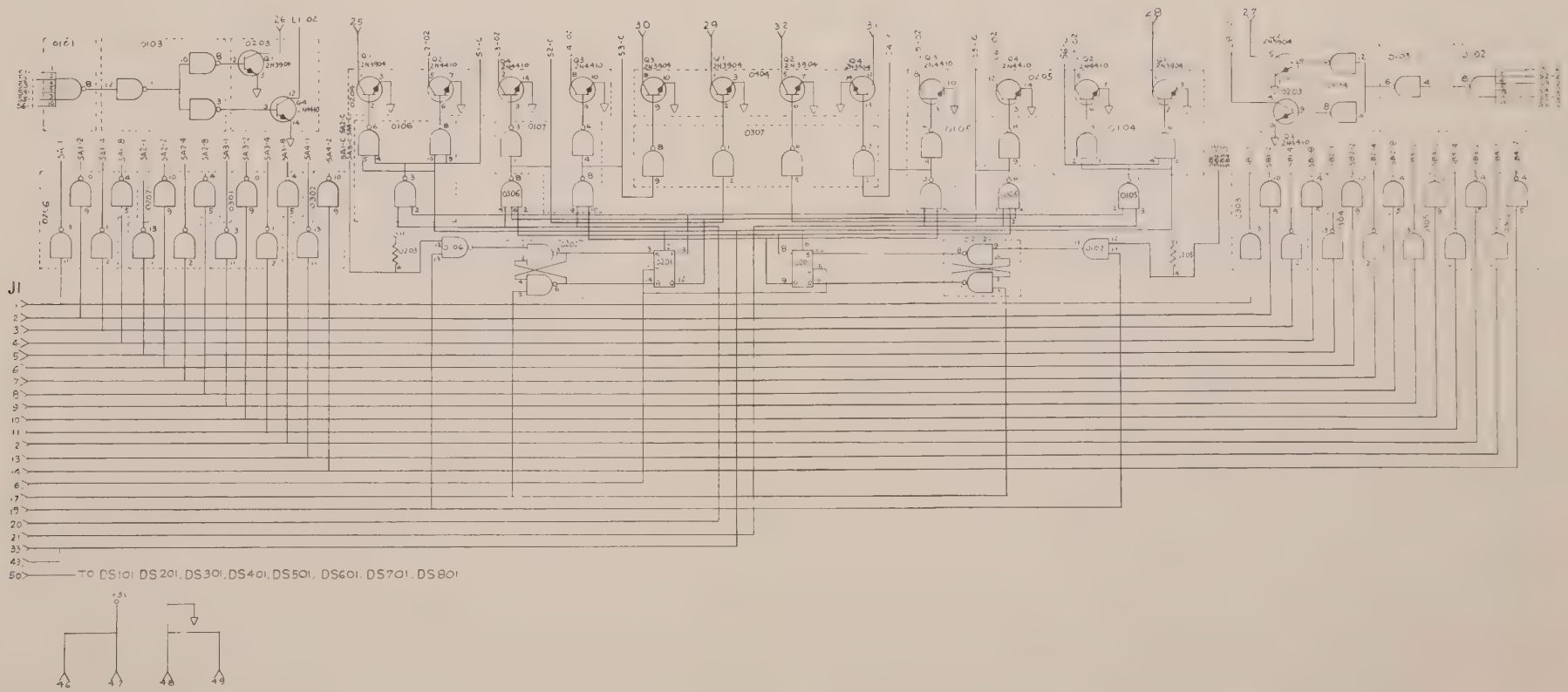

Figure 4-1. Model 1401 Limits Comparator Schematic Diagram

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Electro Scientific Industries, Inc. maintains reference standards of measurement which are compared with the U. S. National Standards through frequent tests by the U. S. National Bureau of Standards.

ESI working standards and testing apparatus used are calibrated against the ESI reference standards in a rigorously maintained program of measurement control.

The manufacture and final calibration of all ESI instruments are controlled by use of the ESI reference and working standards and testing apparatus in accordance with established procedures and documented results. (Reference MIL-C-45662)

Final calibration of this instrument was performed with reference to the mean values of the ESI reference standards or to ratio devices that were verified at the time and place of use.

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WARRANTY OF QUALITY

Electro Scientific Industries, Inc. warrants its products to be free from defects in material and workmanship for the following periods:

1. Two years for components and instruments using passive circuitry. One year for repairs of out-of-warranty items.
2. One year for components and instruments using active circuitry (see ESI Metrology Catalog). Six months for repairs of out-of-warranty items.

During the in-warranty periods, we will service or, at our option, replace any device that fails in normal use to meet its published specifications. Batteries, tubes and relays that have given normal service are excepted.

Would you like more information?

There is a complete bibliography of ESI technical publications on the opposite side of this page. Underline the titles or order numbers of any publications you would like us to send. If there is any information that you would like to have, or if there is any comment you would like to make concerning the instrument or instruction manual, please fill out this page.

Instrument Description: Model No. _____ Serial No. _____
(Please Print)

Name _____ Title _____

Department _____ Mail Stop _____

Company _____

Address _____

City _____ State _____ Zip Code _____

Any comments or corrections? _____

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